

承 認 書
SPECIFICATION FOR APPROVAL

客户名称: 深圳市立创电子商务有限公司
Customer:

产品型号: M/C 224J/1600V P22.5mm
Product Type:

产品编码: C2913433
Product Code:

客户料号: HAPD1K6P22J0N200
Customer Code:

日期: 2021年12月02日

Approval signature:

AUTHORIZED BY	CHECK BY	VALIDATED BY

承认后请寄回一份 (Please return one copy after approved)

东莞市弘源电子有限公司

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FAX:0769-87333314

确 认		制 作	刘静
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APD 系列承认

NO	客户料号	规格	料号
1		224J/1600V 26*20*11 P=22.5	HAPD1K6P22J0N200
2		以下空白	
3			
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PRODUCT SPECIFICATIONS

ISSUED DATE :

2021/12/02

CUSTOMER: : 立创

CUSTOMER'S REFERENCE :

DESCRIPTIONS : IGBT吸收电容器(PCB)

HONGFARAD TYPE: : HAPD1K6P22J0N200

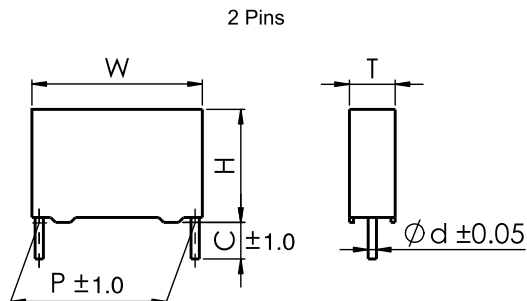


Fig. 1

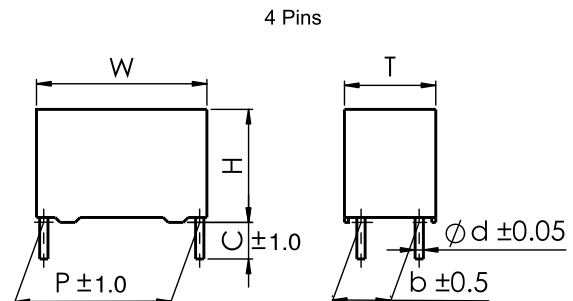


Fig. 2

1. PRODUCT DIMENSIONS :

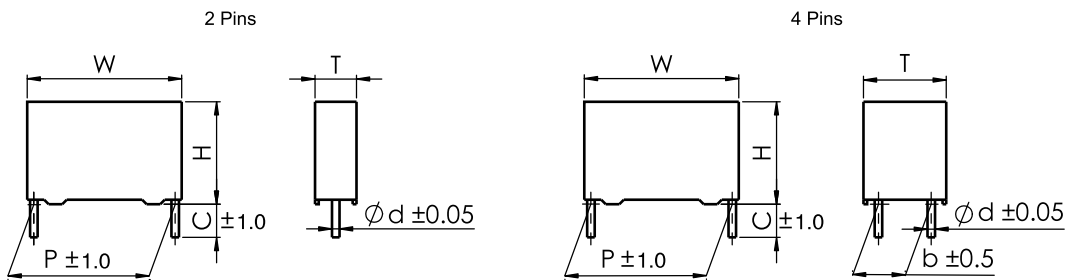
unit : mm

[illegible]



IGBT吸收电容器(PCB)
Snubber capacitor for IGBT (PCB)

外形图 Outline Drawing



特点

- 广泛应用于高压高频脉冲电路中
- 损耗小，内部温升小
- 优异的阻燃性能
- 适合作为IGBT的吸收电容

Features

- Widely used in high voltage, high frequency circuit
- Low loss and small inherent temperature rise
- Excellent active and passive flame resistant circuit
- Especially designed as snubber capacitor for IGBT

技术要求 Specifications

引用标准 Reference Standard	GB/T 17702 (IEC 61071)	
气候类别 Climatic Category	40/85/56	
工作温度范围 (外壳) Operating Temperature Range (case)	-40℃ ~ 85℃	
额定电压 Rated Voltage	630Vdc ~ 3 000Vdc	
电容量范围 Capacitance Range	0.047μF ~ 9.0μF	
电容量偏差 Capacitance Tolerance	J(± 5%), K(± 10%)	
耐电压 Test Voltage	1.5U _N (10s)	
损耗角正切 Dissipation Factor	≤ 0.0005 (1kHz, 20℃)	
绝缘电阻 Insulation Resistance	≥ 100 000MΩ , C _N ≤ 0.33μF	(20℃ , 100Vdc,1min)
	≥ 30 000s C _N > 0.33μF	
预期寿命 Expected lifetime	≥ 100 000hrs @ U _N , Θ _{hs} =70℃	



16 位产品代码如下:

The 16 digits part number is formed as follow:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

H	A	P	D	7	0	0	P	8	2	K	0	R	2	0	0
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H: LOGO



1. 1~3 TYPE OF CAPACITOR:

电容器系列

TYPE	PEI	MEF	MEB	MEK	MEA	MET	MPP	MPD	MPB	PPS	MPS	MPA	MPT
CODE	PEI	MEF	MEB	MEK	MEA	MET	MPP	MPD	MPB	PPS	MPS	MPA	MPT
TYPE	MKP	M61	APB	APD	APA	APT	APK	APQ	APM	DPA	DPB	DAT	DAL
CODE	MKP	M61	APB	APD	APA	APT	APK	APQ	APM	DPA	DPB	DAT	DAL

2. 4~6 RATED VOLTAGE:

额定电压

063: 63VDC/JIS 1J.

400: 400VDC/JIS 2G.

1K5: 1,500VDC

100: 100VDC/JIS 2A.

630: 630VDC/JIS 2J.

1N0: 10,000VDC/JIS 4A.

250: 250VDC/JIS2E.

1K0: 1,000VDC/JIS 3A.

2A7: 275VAC 3A1:310VAC.

3. 7~9 Symbols of capacitance in uF:

电容器容量代码

A: Indicates tens. EX: 12uF=A12, 10uF=A10.

W(Word): Indicates unit. EX: 6.5uF=W65

P(Point): Digits following the decimal point. EX: 0.22uF=P22

S(Single Zero): Digits following the decimal point followed by one zero. EX: 0.015uF=S15

D(Double Zeroes): Digits following the decimal point followed by two zeroes. EX: 0.0047uF=D47

T(Triple Zeroes): Digits following the decimal point followed by three zeroes. EX: 0.00068uF=T68

4. 10 Symbols of capacitance Tolerance:

容量公差代码

TOLERANCE	±1%	±2%	±3%	±5%	±10%	±20%	+80%-20%	+100%-0%
CODE	F	G	H	J	K	M	Z	P

5. 11 Lead Style Code:

引脚方式

CODE	0(不加工)	1(内弯)	2(外弯)	3(内外弯)	4(切脚)
LEAD TYPE					
CODE	5(内弯切脚)	6(外弯切脚)	7(内外弯切脚)	A(直角编带)	B(弯脚编带)
LEAD TYPE					

6. 12 Lead Space (mm)

引线脚距

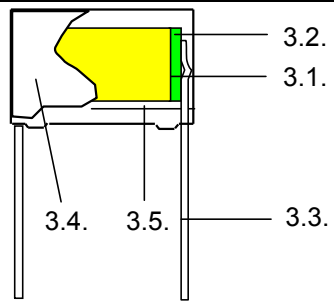
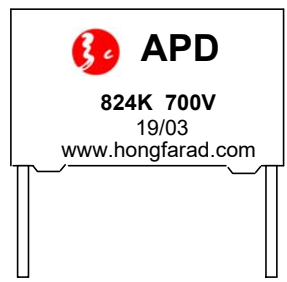
SPACE	3.5	4.0	5.0	6.0	7.5	10.0	12.5	15.0	20.0	22.5	27.5	30.0	31.5	32.0	37.5	42.5	
CODE	A	B	C	E	D	F	V	I	M	N	R	U	S	T	Q	W	O
SPACE	47.5	52.5	17.5	25													
CODE	P	Y	K	H													

7. 13~14 引线脚长 Lead Length 3A=3.5 4A=4.5 05=5mm 5A=5.5 20=20mm

8. 15 特征码 Feature Codes 所有产品符合ROHS/REACH:0;无卤: A; 阻容降压: B; 防潮: D; 低噪音: Y

9. 16 内部码 Internal Codes

PRODUCT SPECIFICATIONS
TYPE : APD

NO.	ITEM	DESCRIPTIONS
1.	SCOPE	This specifications cover the requirements of HONGFARAD Metallized Polypropylene Film Capacitor Snubber capacitor for IGBT (PCB) Type : APD
2.	STANDARD ATMOSPHERIC CONDITIONS FOR MAKING MEASUREMENTS	
2.1.	AMBIENT TEMPERATURE	15°C to 35°C (If there is any doubt on the results, the measurements shall be made at +20 +/- 5°C.)
2.2.	RELATIVE HUMIDITY (R.H.)	45% to 75% (If there is any doubt on the results, the measurements shall be made at 60% to 70%.)
2.3.	AIR PRESSURE	86 kpa to 106 kpa.
2.4.	OPERATING TEMPERATURE RANGE	Operating temperature range to capacitors shall be -40°C~105°C (Above 85°C the rated voltage DC/AC must be de-rated at 1.5% / 2.5% per °C)
3.	CONSTRUCTION	
3.1.	DIELECTRIC	
3.2.	METAL SPRAY	
3.3.	LEAD WIRE	
3.4.	PLASTIC CASE	
3.5.	EPOXY RESIN	
		Metallized Polypropylene Film Special Solder Tin-plated Copper Wire UL94V-0 UL94V-0
4.	MARKING	
4.1.	MANUFACTURER'S SYMBOL	 stands for HONGFARAD
4.2.	TYPE OR MATERIAL	"DPB" stands for DPB type.
4.3.	NOMINAL CAPACITANCE	in EIA 3-digit code (Please refer to "PART NUMBERING") .
4.4.	TOLERANCE	in EIA 1-letter code (Please refer to "PART NUMBERING") .
4.5.	RATED VOLTAGE	in VDC rating, unless otherwise indicated.
4.6.	MANUFACTURER CODE	example: 

PRODUCT SPECIFICATIONS

TYPE : **APD**

5. ELECTRICAL CHARACTERISTICS				
NO.	ITEM		PERFORMANCE	TEST CONDITIONS
5.1.	Withstand Voltage (TV)	Between Terminals	Shall be no abnormality.	Apply 160% of rated voltage for 10 sec. at +20 +/- 5°C.
		Between Terminals & Enclosure	Shall be no abnormality.	3000VAC for 60 +/- 1 sec. (50Hz)
5.2.	Insulation Resistance (I.R.)		>= 30,000 Mohm*uF/C	Apply 100 VDC +/- 15% for 60 +/- 5 sec. at +20 +/- 5°C.
5.3.	Capacitance (CAP)		Within the tolerance specified. (at +20 +/- 5°C).	Measuring Frequency : 1 KHz +/- 10%. Measuring Voltage : <= 1 Vrms.
5.4.	Dissipation Factor (DF)		<= 0.002 (0.20%) at 1 KHz. C≤20uF <= 0.003 (0.30%) at 1 KHz. C>20uF	Measuring Frequency : +/- 2% Measuring Voltage : <= 1 Vrms.
5.5.	ESR (100KHz)		4.8mΩ (typica)	Measuring Frequency : 100KHz +/- 2% Measuring Voltage : <= 1 Vrms.
5.6.	Solderability		More than 95% of circumferential surface of lead wire shall be covered with new solder.	Testing method per IEC 68-2-20 Ta. Soldering temperature : +245 +/- 2°C. Immersion duration : 2 +/- 0.5 sec.
5.7.	dv/dt (v/us)		485V/us	
5.8.	SVDC		800V	DC
5.9.	Ripple voltage (Urms)			
5.10.	max, ripple current capability (Irms)		12Arms	10KHz (70°C)
5.11.	SLE (nH)			
5.12.	Ipk(A)		398A	
6. MECHANICAL CHARACTERISTICS				
NO.	ITEM		PERFORMANCE	TEST CONDITIONS
6.1.	Terminal Strength	Tensile	Shall be no abnormality.	Testing method per IEC 68-2-21. Apply 2.0 kg for 10 +/- 2 sec. to the terminal in the axial direction, and acting in a direction away from the body.
		Bending	Shall be no abnormality.	Apply 1.0 kg for 2 cycles. Each cycle includes: 90° once, return to its initial position for 2-3 sec., and then to the opposite direction once.
7. ENDURANCE CHARACTERISTICS				
NO.	ITEM		PERFORMANCE	TEST CONDITIONS
7.1.	Temperature Cycle	Appearance	Shall be no remarkable change.	Test Temperature Cycle : Total 5 cycles. Each cycle includes : 1. +20 +/- 2°C for 3 min. 2. -40+0/-3 °C for 30 min. 3. +20 +/- 2°C for 3 min. 4. +85 +3/-0 °C for 30 min. 5. +20 +/- 2°C for 3 min.
		Withstand Voltage	Shall satisfy No. 5.1.	
		Capacitance Change Rate (ΔC/C)	Within +/- 5% of the value before test.	
		Dissipation Factor	Tan δ :0.4% max. (1KHz)	
		Insulation Resistance (I.R.)	>= 50% of the limit value of No. 5.2.	

PRODUCT SPECIFICATIONS

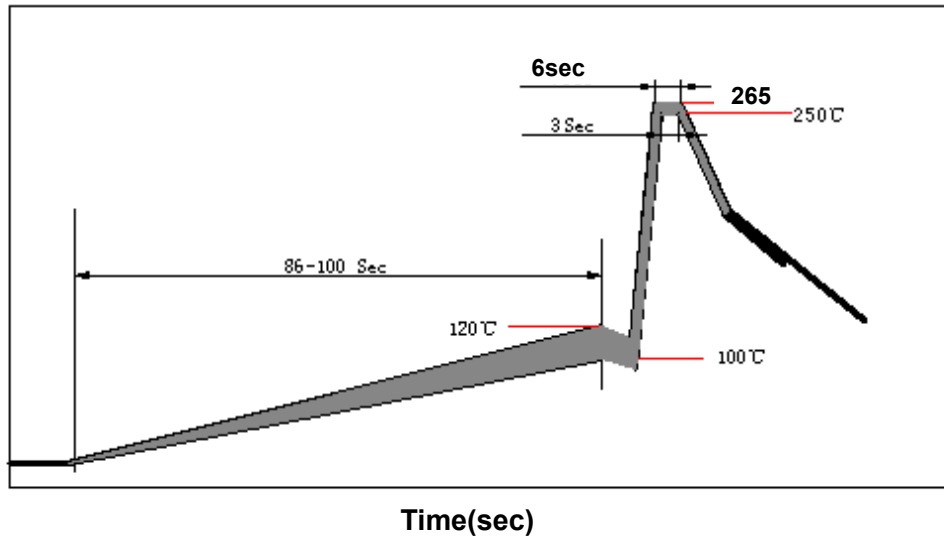
TYPE : **APD**

7.2.	High Temperature Loading	Appearance	Shall be no remarkable change.	Test Temperature : +85 +/-2°C. Apply 130% of rated voltage for 1,000 +24/-0hrs; After test, allow it stay alone for 4 hrs at standard temperature and humidity before making measurements.
		Withstand Voltage	Shall satisfy No. 5.1.	
		Capacitance Change Rate ($\Delta C/C$)	Within +/- 10% of the value before test.	
		Dissipation Factor	Tan δ :0.4% max. (1KHz)	
		Insulation Resistance (I.R.)	>= 50% of the limit value of No. 5.2.	
7.3.	Soldering Heat Resistance	Appearance	Shall be no remarkable change. The marking shall be legible.	1) Flow soldering: Preheat temp 100~120°C Preheat Duration :100sec.max. Soldering Temperature : +260 +/- 5°C. Immersion Duration : ≤ 10 sec. Immersion Depth : 1.5 +/- 0.5 mm from roots. 2) Iron soldering Soldering Temperature : +400°C. . Immersion Duration : ≤ 3 sec. After test, allow it stay alone for 1.5 +/- 0.5 hrs. at standard temperature and humidity before making measurements.
		Withstand Voltage Between Terminals	Shall satisfy No. 5.1.	
		Capacitance Change Rate ($\Delta C/C$)	Within +/- 3% of the value before test.	
		Dissipation Factor	Tan δ :0.4% max. (1KHz)	
		Insulation Resistance (I.R.)	>= 50% of the limit value of No. 5.2.	
		Connection of Element	Shall be stable.	
7.4.	Dry Heat Resistance	Appearance	Shall be no remarkable change.	Test Temperature : +85 +/- 2°C Test Duration : 16 +1/-0 hrs.
		Withstand Voltage	Shall satisfy No. 5.1.	
		Capacitance Change Rate ($\Delta C/C$)	Within +/-5% of the value before test.	
		Dissipation Factor	Tan δ :0.4% max. (1KHz)	
		Insulation Resistance (I.R.)	>= 50% of the limit value of No. 5.2.	
7.5.	Cold Resistance	Appearance	Shall be no remarkable change.	Test Temperature : -40+/-3 °C Test Duration : 2 +1/-0hrs.
		Withstand Voltage	Shall satisfy No. 5.1.	
		Capacitance Change Rate ($\Delta C/C$)	Within +/-3% of the value before test.	
		Dissipation Factor	Tan δ :0.4% max. (1KHz)	
		Insulation Resistance (I.R.)	>= 50% of the limit value of No. 5.2.	
7.6.	Humidity Resistance	Appearance	Shall be no remarkable change.	Test Temperature : +40 +/- 2°C. Test Humidity : 90% to 95% R.H. Test Duration : 1000+24/-0 hrs After test, allow it stay alone for 4 hrs at standard temperature and humidity before making measurements.
		Withstand Voltage	Shall satisfy No. 5.1.	
		Capacitance Change Rate ($\Delta C/C$)	Within +/-10% of the value before test.	
		Dissipation Factor	Tan δ :0.4% max. (1KHz)	
		Insulation Resistance	>= 50% of the limit value of No. 5.2.	

PRODUCT SPECIFICATIONS

TYPE : **APD**

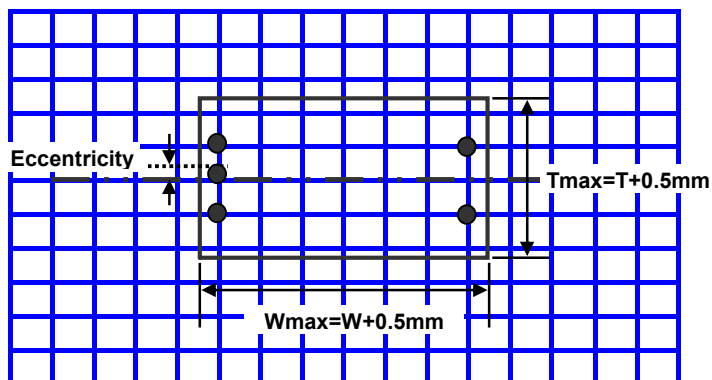
NO.	ITEM		PERFORMANCE	TEST CONDITIONS
7.7.	Vibration Resistance	Connection Strength	Shall be no open nor short-circuiting. The connection shall be stable.	Testing method per IEC 68-2-6 Fc. Frequency Change : 10--55--10 Hz. Vibration Distance : 1.5 mm. Test Direction : X, Y, Z. Test Duration : 2 +1/-0 hrs each direction.
		Appearance	Shall be no mechanical damage.	
7.8.	Rapid Temperature Change	Appearance	Shall be no remarkable change.	Testing method per IEC 68-2-14 Na. Test Temperature Cycle : Total 5 cycles. High Temperature : +85 +/-5 °C Low Temperature : -40 +/-5°C 30 min +/- 10% for each temperature.
		Withstand Voltage	Shall satisfy No. 5.1.	
		Capacitance Change Rate (ΔC/C)	Within +/- 3% of the value before test.	
		Dissipation Factor	Tan δ :0.4% max. (1KHz)	
		Insulation Resistance	>= 50% of the limit value of No. 5.2.	
7.9.	High Temperature High Humidity Loading (THB)	Appearance	Shall be no remarkable change.	Test Temperature : +85 +/- 2°C. Test Humidity : 85% ±2% R.H. Loading Voltage: Rate voltage Test Duration :1000 +24/-0 hrs After test, allow it stay alone 6 hrs at standard temperature and humidity before making measurements.
		Withstand Voltage	Shall satisfy No. 5.1.	
		Capacitance Change Rate (ΔC/C)	Within +/- 10% of the value before test.	
		Dissipation Factor	Tan δ :0.5% max. (1KHz)	
		Insulation Resistance	>= 50% of the limit value of No. 5.2.	
7.10.	Expected Operating Life		100,000 hours @ Tcase=75°C, rated voltage	
8 ACCEPTABLE QUALITY LEVEL (AQL)				
NO.	ITEM		AQL	SAMPLING PLAN
8.1.	Appearance AQL		0.65	According to MIL-STD-105E level II GB2828-2003 Level II . By lot outgoing inspection.
8.2.	Dimension AQL		0.65	
8.3.	Mechanical Characteristics AQL		0.40	
8.4.	Electrical Characteristics AQL			
	CAP, DF, TV, IR,		0.04 Zero Defect	



Note: Don't suitable for reflow soldering operations



The maximum length and width of film capacitors are shown in the following drawing

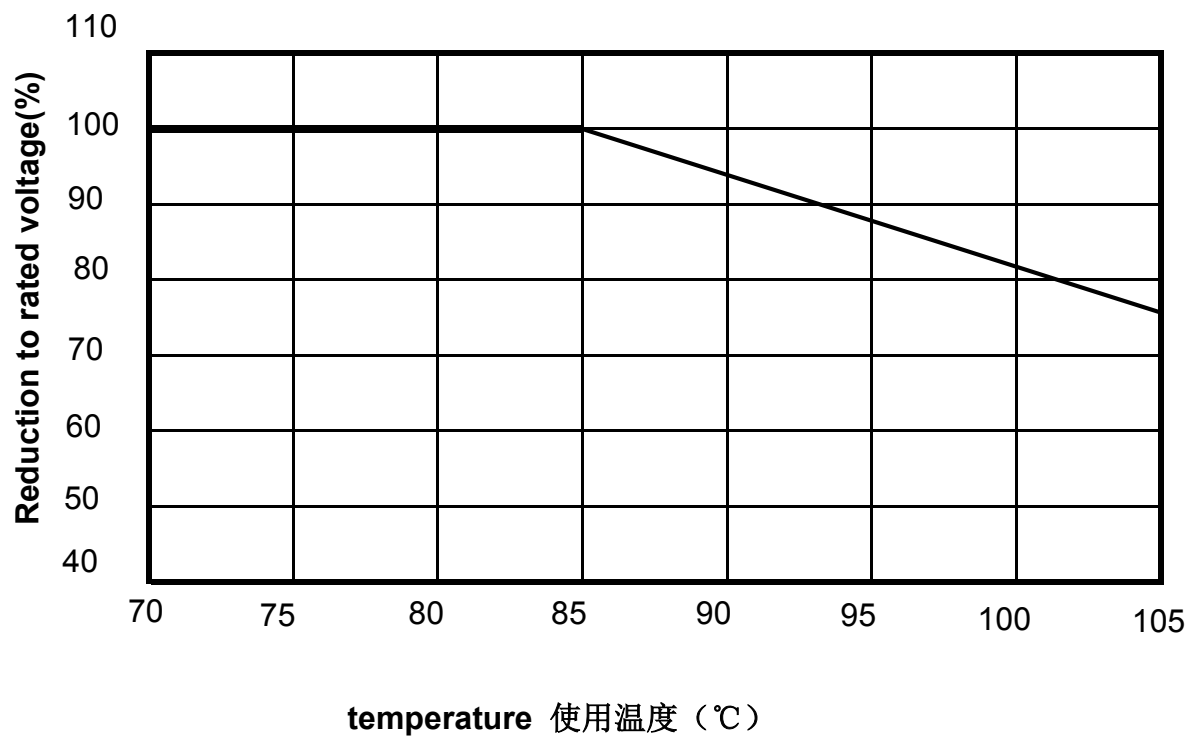


Eccentricity as in drawing

The maximum eccentricity is smaller than or equal to the lead diameter of the product concerned



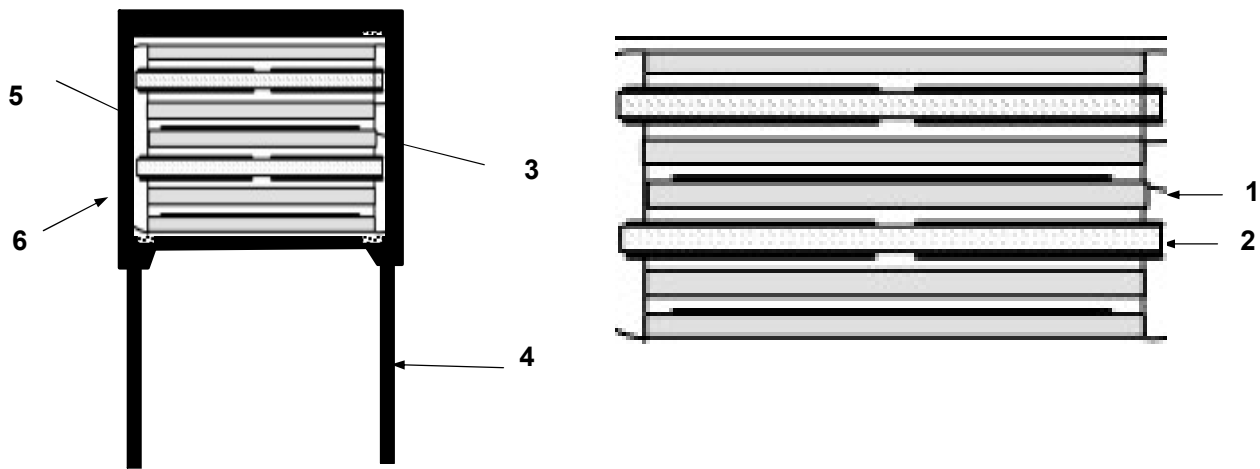
Hongfarad



PRODUCT SPECIFICATIONS

TYPE : **APD**

CONSTRUCTION & MATERIAL LIST :



NO.	Item	Materials
1	DIELECTRIC FILM	Metallized Polypropylene Film
2	DIELECTRIC FILM	Double-side metalized film
3	METAL SPRAY	Special Solder
4	LEAD WIRE	Tin-plated Copper Wire
5	RESIN	Epoxy Resin(UL94V-0)
6	CASE	Plastic Case(UL94V-0)

